



Invisible Strobe Flash

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PARTS:

- [Flash lamp \(1\)](#)

[Party and Halloween stores carry 120V AC versions, and auto stores have smaller 12V DC strobes. You can also assemble a kit from Electronic Goldmine \(\[goldmine-elec.com\]\(http://goldmine-elec.com\)\).](#)

- [Power source \(1\)](#)

[if you use an automotive strobe](#)

- [Window tint film \(1\)](#)

[from an auto store](#)

- [Security camera \(1\)](#)

[Color CCDs are less sensitive to light, and many color video cameras have built-in IR filters that block the illumination we're working so hard to create.](#)

- [Lens \(1\)](#)

[Cheap security camera lenses will work, but good-quality used lenses made for 8mm and 16mm movie cameras are better. The CS mount fits new monochrome cameras, but you can use older C mounts with an inexpensive adapter. Avoid electronic zoom/focus and auto-iris; manual focus and aperture \(f-stop\) adjustment are best. For nighttime videography, everything is wide open anyway.](#)

SUMMARY

A few years ago, I began documenting the bats flying around my backyard bat house, using

inexpensive, monochrome security cameras and a DVD recorder. The little mammals streaked impressively through the frame, but I was disappointed when I started single-framing through to see what they looked like. In each frame showing a bat, it was a mere blur.

I decided to use a xenon strobe to freeze the bats in the images. It wouldn't be synched to the video frame rate, but the combination would be statistically likely to capture at least a few usable stills.

The problem was, some bat experts I consulted thought the strobe would delay their activity and might even drive them away. So I needed to make a subtle strobe, which sounds like an oxymoron.

I knew that xenon tubes produce a wide spectrum, and many tinted plastics block visible light but pass near-infrared (NIR) wavelengths that monochrome cameras are sensitive to. After some experimentation, I found that filtering the flash through 5 layers of "Limo Black" window tint film darkens it to a dim purple spark, but illuminates the field of a sensitive video camera from 10 feet or more.

Step 1 — Set up the strobe and filter.



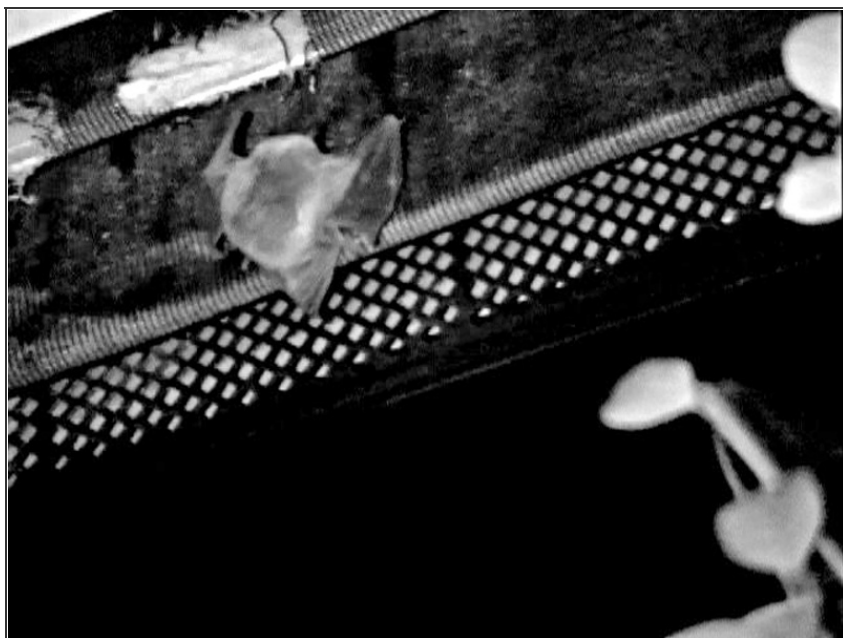
- For an automotive strobe, just wrap 4-5 layers of film around the face and duct-tape them together in back. Leave the leads hanging out so you can connect a battery or other 12V DC power source.
- For plug-in strobes, make a filter by stacking 4–5 squares of film (there's nothing magic about 5 layers; you should experiment). Don't remove the film's transparent backing, which makes it easier to handle. If the strobe has a slot for a colored filter, slide it in there. Failing this, just stick the film over the strobe with duct tape. I mounted my camera and strobe to a board to make a single unit. It's ugly, but we're using this in the dark, right?


Step 2 — Focus your camera for darkness.



- Focusing an IR-sensitive camera for darkness is tricky for two reasons. The longer wavelengths make the focal length longer, due to chromatic aberration. And you're shooting at maximum aperture, which minimizes depth of field.
- One way to set the focus for NIR is to focus the camera in daylight with 1–2 layers of tint film over the lens. Another way is to cover an incandescent or halogen floodlight with layers of tint film and use it to illuminate darkened areas. Experiment with the focus and check the video for what works best.

Step 3 — Shoot some creatures



- If the strobe rate is adjustable, as with plug-in strobes, set it to the maximum. I'm aiming for bats, but the NIR strobe will work fine for any nighttime subject, moving or not: the neighbor's cat digging up your garden, a passing opossum, and so forth.
- Have patience; the vast majority of frames will be empty, dark, or both. When I find a hit, I bring it into GIMP (gimp.org). First I de-interlace the video, because only one-half (every other scan line) of the frame will be illuminated by the flash. To improve the image, I then usually adjust brightness and contrast and apply an Unsharp Mask.
- I'm not keen on "Do Not Use in Bathtub" warnings, but  you should not disassemble a strobe unless you know what you're doing, to avoid shocks from its internal capacitors. Also, no one should look at a strobing NIR at close range. Pupils dilate in the dark based on visible light, and the strobe can hit them with possibly damaging levels of infrared.

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